Arctic Weather of Late January 2008

During the overnight hours of January 27th into the 28th, portions of northeast Montana saw temperatures initially as warm as the low 30s drop sharply to near zero in the matter of a few hours as the strongest arctic front of the season raced across the state. By late evening on the 28th, most temperatures across northeast Montana had plunged to 15 to 20 degrees below zero! Considering portions of the Glasgow forecast area had highs approaching 50 degrees above zero on the 27th, this front was a rude reminder that winters in northeast Montana can see drastic swings in temperature over a short period of time.

As if the bitterly cold air was not enough of a discomfort by itself, strong northwest winds of 25 to 35 mph with frequent gusts approaching 50 mph combined with snow to produce areas of near blizzard-like conditions during the late morning and afternoon hours of the 28th. Snowfall amounts across northeast Montana did vary with most locations seeing at least a trace to an inch of new snow, however Glasgow reported four inches.

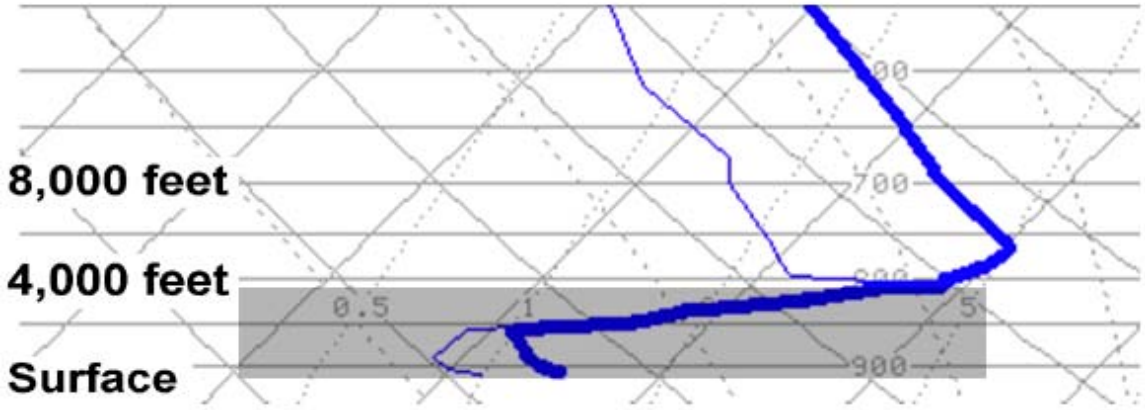
Although the strong winds and snow began easing their grip during the late evening hours on the 28th, wind chill values still managed to plummet to 50 to 60 degrees below zero in many locations with a downright piercing 63 below zero reading measured at the Lindsay Divide in McCone County. Other low wind chill readings from across the area included -59 in northwest Roosevelt County, -52 in Plentywood, -51° F in Glasgow, -47° F in Sidney, and -44° F in Malta.

While far from a record low, the morning low temperature in Glasgow on the 29th was measured at -28° F. Wind chills slowly improved to a more tolerable 20 to 30 below zero by midday despite high temperatures remaining below zero area wide. Remarkably, over the course of the next two days the temperature in Glasgow improved an amazing 56 degrees (-28° F to +28° F) as the arctic front temporarily nudged northward.

From a forecasting standpoint, an especially challenging problem during arctic outbreaks involves forecasting just how long the bitterly cold airmass remains over a particular area. Since the arctic air is typically just a few thousand feet in depth, the air just aloft is significantly warmer. The rate at which this much warmer air is mixed to the surface can be difficult to predict and often times is the deciding factor in whether or not an area will see frigid or mild high temperatures.

The figures on the following page reveal how this particular arctic event transitioned as measured by the Glasgow upper air soundings from the mornings of the 28th and 29th. The thick blue line represents the vertical temperature profile in the atmosphere while the thin blue line denotes the dewpoint temperature. The gray shaded area represents the depth of the arctic air. While initially around 4,000 feet in depth, this arctic air shrunk to a mere 700 feet thick by Thursday morning thanks to strong, warm westerly winds aloft eroding this cold layer. Continued erosion of the arctic layer allowed the Thursday high temperature in Glasgow to reach 28 degrees above zero.

Monday, January 28 at 5am



Thursday, January 31 at 5am